U.S. FISH AND WILDLIFE SERVICE
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: *Tympanuchus pallidicinctus*

COMMON NAME: lesser prairie-chicken

LEAD REGION: Region 2

INFORMATION CURRENT AS OF: October 2005

STATUS/ACTION:

___ Species assessment - determined we do not have sufficient information on file to support a proposal to list the species and, therefore, it was not elevated to Candidate status.
___ New candidate
_X_ Continuing candidate
___ Non-petitioned
_X_ Petitioned - Date petition received: October 5, 1995
X 90-day positive - FR date: July 8, 1997
X 12-month warranted but precluded - FR date: June 9, 1998
_ Did the petition requesting a reclassification of a listed species? NO

FOR PETITIONED CANDIDATE SPECIES:
a. Is listing warranted (if yes, see summary of threats below)? Yes
b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? Yes
c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded.
During the past 12 months, almost our entire national listing budget has been consumed by work on various listing actions to comply with court orders and court-approved settlement agreements, emergency listings, and essential litigation-related, administrative, and program management functions. We will continue to monitor the status of this species as new information becomes available. This review will determine if a change in status is warranted, including the need to make prompt use of emergency listing procedures. For information on listing actions taken over the 12 months, see the discussion of "Progress on Revising the Lists," in the current CNOR which can be viewed on our Internet website (http://endangered.fws.gov/).
___ Listing priority change
Former LP: ___
New LP: ___
Date when the species first became a Candidate (as currently defined): June 9, 1998

___ Candidate removal: Former LP: ___
___ A – Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or

continuance of candidate status.

___U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.

___ F – Range is no longer a U.S. territory.

___ I – Insufficient information exists on biological vulnerability and threats to support listing.

___ M – Taxon mistakenly included in past notice of review.

___ N – Taxon does not meet the Act's definition of "species."

___ X – Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY*:* Birds; Phasianidae

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Colorado, Kansas, New Mexico, Oklahoma, and Texas

CURRENT STATES/ COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: Colorado, Kansas, New Mexico, Oklahoma, Texas / USA

LAND OWNERSHIP: Currently, 95 percent of occupied range is privately held. The remaining 5 percent is managed by the Bureau of Land Management in New Mexico, and the U. S. Forest Service in Colorado, Kansas, New Mexico and Oklahoma.

LEAD REGION CONTACT: Susan Jacobsen, 505-248-6641

LEAD FIELD OFFICE CONTACT: Oklahoma Ecological Services Field Office, Stephanie A. Harmon, 918-581-7458 ext. 229.

BIOLOGICAL INFORMATION

Species Description: Plumage of the lesser prairie-chicken (*Tympanuchus pallidicinctus*) is similar to greater prairie-chicken (*T. cupido*), although somewhat lighter, and is characterized by alternating brown and buff-colored barring and the average length ranges from 38-41 cm (15-16 in) (Johnsgard 1973). Males have long tufts of feathers on the sides of the neck that are erected during courtship display. Males also display yellow-orange supraorbital eyecombs and reddish-purple esophageal air sacs during courtship displays (Copelin 1963, Johnsgard 1983).

General Ecology: Lesser prairie-chickens are polygynous and exhibit a lek mating system. Males gather to display on leks at dusk and dawn beginning in late February through early May (Copelin 1963, Hoffman 1963, Crawford and Bolen 1975). A dominant older male occupies the center of the lek, while younger males gather in outlying areas. Females arrive at the lek in early spring; peak hen attendance at leks is during mid-April (Copelin 1963, Haukos 1988). The sequence of vocalizations and posturing of the dominant male, termed "booming," has been described by Johnsgard (1983) and Haukos (1988). After mating, the hen selects a nest site, usually 1-3 km (0.6-2 mi) from the lek (Giesen 1994b), and lays an average clutch of 10-14 eggs (Bent 1932, Taylor and Guthery 1980). Second nests may occur when the first attempt is

unsuccessful. Incubation lasts 23-26 days and young leave the nest within hours of hatching (Coats 1955). Broods may remain with females for 6-8 weeks (Ehrlich et al. 1988). Campbell (1972) estimated a 65 percent annual mortality rate, and a 5-year maximum life span. Giesen (1997) provided a comprehensive summary of lesser prairie-chicken breeding behavior, habitat, and phenology.

Taxonomy: The lesser prairie-chicken is in the Order Galliformes, Family Phasianidae, subfamily Tetraoninae, and is recognized as a species separate from the greater prairie-chicken (American Ornithologist's Union 1957). Lesser prairie-chickens were first described as a subspecies of the greater prairie-chicken (Ridgway 1873), but were granted specific status in 1885 (Ridgway 1885). A discussion of lesser prairie-chicken taxonomy is found in Giesen (1997).

Habitat: Lesser prairie-chickens historically occupied areas of mixed sand sagebrush- (*Artemesia filifolia*) or shinnery oak- (*Quercus havardii*) bluestem grasslands in portions of southeastern Colorado (Giesen 1994a), southwestern Kansas (Schwilling 1955), western Oklahoma (Duck and Fletcher 1944), the Texas Panhandle (Henika 1940, Oberholser 1974), and eastern New Mexico (Ligon 1927).

Historical Range/Distribution: In the early twentieth century, lesser prairie-chickens were reportedly common throughout their five-state range (Bent 1932, Baker 1953, Sands 1968, Fleharty 1995). Lesser prairie-chickens still occur within each state, although their distribution within those states has declined (Bent 1932, Taylor and Guthery 1980, Giesen 1998).

Current Range/Distribution: The area originally occupied by lesser prairie-chickens was estimated as 358,000 square kilometers (138,225 square miles), and by 1969 it had declined to an estimated 125,000 square kilometers (48,263 square miles) due to wide scale conversion of native prairie to cultivated cropland (Taylor and Guthery 1980 based on Aldrich 1963). In 1980, occupied range was estimated at 27,300 square kilometers (10,541 square miles), which represented a 78 percent decrease in range since 1963, and a 92 percent decrease since the 1800s (Taylor and Guthery 1980).

Population Estimates/Status: Little information is available on lesser prairie-chicken populations prior to 1900. Litton (1978) suggested that as many as two million birds may have been in Texas alone prior to 1900. We are aware of no independent estimate to corroborate Litton's (1978) claim, and the source or methodology behind his estimate is unknown. However, in the early twentieth century, lesser prairie-chickens were reportedly quite common throughout their range in Colorado, Kansas, New Mexico, Oklahoma, and Texas (Bent 1932, Baker 1953, Bailey and Niedrach 1965, Sands 1968, Fleharty 1995). By the 1930s, extensive cultivation, overgrazing, and drought had begun to cause the species to disappear from sections where it had been abundant (Bent 1932, Baker 1953, Bailey and Niedrach 1965, Davison 1940, Lee 1950, Oberholser 1974). Lesser prairie-chicken abundance appeared to fluctuate somewhat during the 1940s and 1950s (Copelin 1963, Snyder 1967, Crawford 1980), and by the early 1970s, the total fall population may have been reduced to about 60,000 birds (Crawford 1980). By 1980, the estimate of total fall population was approximately 44,000 to 53,000 birds (Crawford 1980).

Each of the five state wildlife agencies provided information regarding the status of the lesser prairie-chicken. Most states collect data in the form of one or both of the following indices: average lek size (i.e., number of males per lek); or density of leks within a certain area. In general, each of the state wildlife agencies believes that they are unable to provide a precise estimate of lesser prairie-chicken population abundance in their state. In the absence of bird density, the number of active leks over large areas was recommended as the most reliable trend index for prairie grouse populations (Cannon and Knopf 1981).

Colorado - Lesser prairie-chickens were likely resident in six counties in Colorado prior to settlement. At present, lesser prairie-chickens are known to occupy portions of Baca, Cheyenne, Prowers, and Kiowa Counties. In Colorado, the lesser prairie-chicken has been state-listed as threatened since 1973. The total number of lesser prairie-chickens counted on leks increased substantially between 1959 and 1990, as did survey effort. Colorado Division of Wildlife (CDOW) estimated a total of 800 to 1,000 lesser prairie-chickens in the state in 1997. In past years, CDOW surveys consisted of assigning four square mile habitat blocks of primarily sandsage habitat and associated lands to individual surveyors. These areas were then intensively searched. The method initiated in 2004 was designed to cover a much broader scale of habitat types and a larger geographic area, particularly to include lands enrolled in the Conservation Reserve Program (CRP). Work done by CDOW volunteers in 2004 and 2005 proved extremely valuable in finding new leks and documenting use of CRP by lesser prairie-chickens.

According to CDOW surveys (Yost 2005), the number of lesser prairie-chickens counted in 2005 was 203 birds with high-count totals for males 151, females 21, and unknowns 31. Birds whose sex was unknown were added into the high-count total, but were not used to calculate means for high male and female counts. Total number of active leks found in 2005 was 32, with 13 in Baca County, 1 in Kiowa County, and 18 in Prowers County.

Seven new leks were found in Prowers County and possibly one new lek in Baca County in 2005. The possible new lek site in Baca was not confirmed since only one visit was made to the site where four birds flushed. Due to time constraints and availability of personnel only part of Kiowa County and no known leks in Cheyenne County were surveyed in 2005. Some searches were conducted in Lincoln County with no birds documented.

In comparison, the total bird count for 2004 was 271 with high count for males 169, females 46, and unknowns 56. Total number of active leks counted in 2004 was 34 with 15 in Baca County, 2 in Cheyenne County, 3 in Kiowa County, and 14 in Prowers County.

In their annual report (Yost 2005), CDOW indicates that the total number of lesser prairie-chickens observed in 2005 is down from 2004 in portions of Cheyenne and Kiowa counties and the known leks in those counties were not surveyed in 2005. The population in Baca County continues in a steady decline, while the Prowers County population is holding steady to increasing. Seven new leks sites were discovered in Prowers County this spring and four new sites were found in 2004. However, despite the increase in number of leks, the total number of chickens counted was actually lower (149 in 2004 compared to 138 in 2005). Several factors may partially explain the lower count other than the possibility the population may be declining. New leks are forming away from the core areas, which essentially disperses birds out over a

wider area, new observers in 2005 failed to locate birds at several historic lek sites even though LPC's were heard calling and seen in the immediate area, historically active leks may have moved and were not detected (Yost 2005).

In addition to CDOW surveys, four individual routes with listening points were run on the southeastern portion of the Comanche National Grasslands in southeastern Colorado. These routes are configured to pass through areas of native range and sand sage where lesser prairie-chickens are known to occur, and the routes compliment lek counts conducted by the CDOW. This is the second year the routes have been run by National Forest Service (NFS) - Comanche National Grasslands (NG) personnel. On the Comanche NG, surveys conducted during 1984 - 2005 identified 53 leks on or immediately adjacent to NFS lands. Studies on the Comanche NG determined that the estimated area occupied by the species during the past 20 years is approximately 65,168 acres (D. Augustine, pers. comm. 2005). On the Comanche NG, lek censuses conducted during 1980-2005 show a sharp decline in the population after 1989. The total population estimate on the Comanche NG was highest in 1988 with 348 birds and the lowest in 2005 with approximately 64 birds and only eight active leks (Minutes, lesser prairie-chicken interstate working group, 2005). The estimate of males/lek in 2005 is reduced nearly 75% from that of 1988. Further, since the species was petitioned for listing in 1995, population estimates on the Comanche NG have dropped yet another 50% (D. Augustine, pers. comm. 2005). Since 1995, lesser prairie-chicken populations on the Comanche NG have exhibited a sharp downward trend.

The CDOW reports that habitat conditions across most of southeast Colorado have improved dramatically over the past two springs, with increased precipitation and abundant cover at most locations. Why lesser prairie-chicken have apparently not responded to these improved conditions in Baca County is perplexing. One hypothesis is that birds moved away from areas severely affected by drought conditions and have not returned. The CDOW notes that 10 of the 11 new leks discovered in Prowers County over the past two springs were found in CRP fields or dry land crop fields away from sandsage pasture, and the active leks in sandsage tended to have fewer birds than in previous years. Only one new lek this spring was found in traditional sandsage habitat. For 2006 more survey effort will be placed on CRP in Baca County and habitat enhancement will continue with inter-seeding of forbs into existing stands of CRP as funding allows (Yost 2005).

Kansas - In the early part of last century, lesser prairie-chickens were considered plentiful in the sandhill and bunchgrass areas of Kansas, and they remained abundant until the droughts of the 1930s. Lesser prairie-chicken historical range included 38 counties, but by 1997 lesser prairie-chickens were only known to exist in 19 Kansas counties. Since that time, biologists have documented populations of lesser prairie-chickens in 16 additional counties north of the Arkansas River. Efforts to document the expansion of lesser prairie-chickens in regions north of the Arkansas River continue. Currently, Kansas Department of Wildlife and Parks (KDWP) in cooperation with the Kansas Biological Survey and Kansas Applied Remote Sensing estimate that lesser prairie-chickens occupy (at varying densities) approximately 7,409,921 acres statewide. Greater prairie-chickens have expanded their range and benefited from native CRP fields. As a result, mixed leks of both lesser and greater prairie-chickens are increasingly common and hybridization between species is now evident. The long-term influence of

hybridization on the lesser prairie-chicken is unknown at this time.

The KDWP classifies the lesser prairie-chicken as an upland game bird, and new harvest regulations for the species will take effect beginning in 2005. For populations south of Interstate 70, the bag limit is one bird daily, and the season now opens November 19 and ends December 31. For populations north of Interstate 70, the daily bag limit is two birds, and the season extends an additional month, ending January 31st. Approximately 120 birds were harvested in Kansas during the 2004 season. Given the reported statewide population estimate of 15,000 – 21,000 birds, (R. Rodgers, pers. comm.), current harvest pressure (i.e., 0.80 – 0.57%, respectively) is minimal.

In 2005, the KDWP surveys along 12 lesser prairie-chicken survey routes resulted in a significant rangewide population index increase of 14% (P = 0.07) over 2004 (Rodgers 2005). This increase follows a 40% increase in 2004 compared to the 2003 estimates (Rodgers 2004). The average number of birds per lek increased 12%, from 12.9 in 2004 to 14.5 in 2005. When combined with surveys of the number of active leks along each route, the estimated number of birds per square mile increased 10%, from 5.0 to 5.5 in 2005.

In addition to private lands in Kansas, lesser prairie-chickens occur on the Cimarron National Grassland, administered by the Forest Service. On the Cimarron NG, birds are present primarily south of the Cimarron River. Surveys conducted on the Cimarron NG during 1988-1997 identified 44 leks and indicated that all Forest Service land south of the Cimarron River (64,387 acres) is occupied. Spring lek counts in the spring conducted along the KDWP survey route showed a decline from a mean of 10.1 birds/square mile during the first 15 years of the survey (1964-1978) to an average of only 4.9 birds/square mile during 1989-2004. More intensive census surveys conducted on the Cimarron NG during 1995-1999 and 2005 involved repeated counts of birds on all known leks. The lek-census method showed a stable population during 1995-1999 and provided total population estimates for the national grassland varying annually from 173-283 birds (Smith and Smith 1999). This survey method was repeated in 2005 and gave a total population estimate of 249 birds, indicating a stable population on the Cimarron NG since 1995 (D. Augustine, pers. comm.. 2005).

New Mexico - In the 1920s and 1930s, the former range of the lesser prairie-chicken in New Mexico was described as all of the sandhill rangeland of eastern New Mexico, from Texas to Colorado, and west to Buchanan in De Baca County. Ligon (1927) mapped the breeding range at that time as encompassing portions of seven counties, a small subset of what he described as former range. In the 1950s and 1960s, occupied range was more extensive, indicating reoccupation of some areas. Presently, the New Mexico Department of Game and Fish (NMDGF) reports that lesser prairie-chicken are known in portions of seven counties, and that they have apparently been extirpated from 3,346 square kilometers (1,292 square miles) of its original 22,390 square kilometer (8,645 square mile) range. In New Mexico, the lesser prairie-chicken is an upland game bird, although the hunting season has been closed since 1996. Estimates of occupied range in New Mexico over the last century suggest a pattern of decline and increase, including reoccupation of former range. In the 1950s, the population was estimated at 40,000 to 50,000, and by 1972, at 6,000 to10,000 individuals. The NMDGF currently estimates the population on non-federal lands to be approximately 3,800 birds.

Existing data from NMDGF survey efforts suggest that sparse and scattered populations of lesser prairie-chicken south of Highway 380 in New Mexico on Bureau of Land Management (BLM) properties and surrounding areas are very low and the trend continues to decline. Best et al.(2003) concluded that anthropogenic factors have rendered the habitat south of Highway 380 inhospitable for long-term survival of lesser prairie-chicken in extreme southeastern New Mexico.

In April 2005, the NMDGF surveyed for lesser prairie-chickens audibly and visually along public roads and on State Game Commission-owned Prairie Chicken Areas (PCAs). This was the eighth year of roadside route survey efforts. Fifty-four leks were detected on 16 of 29 (55%) roadside routes surveyed. Twenty-six routes have been surveyed annually from 1999 to 2005. Total number of leks detected (range = 33-48 leks) has been stable over this time period with no notable increase or decrease over the last 7 years. Twenty-six PCAs were also surveyed. Over the last 10 years, both the number of leks detected and number of prairie chickens observed has steadily increased on PCAs. Of the 135 leks detected on or near PCAs, 726 birds were observed on 73 leks. Average lek size was 9.95 birds/lek. Annual rates of change in population trend suggest overall lesser prairie-chicken numbers are stable or slightly increasing in east-central New Mexico (Davis 2005).

For areas south of Highway 380, BLM biologists indicate that drought, livestock grazing, habitat fragmentation, impacts from oil and gas development/exploration, off-highway vehicle (OHV) use, and other natural factors are possible reasons for the species' current low density throughout previously occupied portions of the Carlsbad BLM unit (Belinda 2003). This is partially supported by recent research examining prairie chicken losses over the past twenty years on Carlsbad BLM lands (Hunt and Best 2004). In this study, factor analysis of characters associated with active and abandoned leks was conducted to determine which potential causes were associated with decline in populations. Two factors accounted for 50.1% of variation within the dataset; petroleum development and grazing pressure. The first factor, which loaded heavily for variables associated with petroleum development, explained 31.5% of observed lek abandonment. The second factor, which loaded heavily for variables associated with grazing pressure, accounted for 18.6% of observed lek abandonment (Hunt and Best 2004).

Oklahoma - Lesser prairie-chickens historically occurred in 22 Oklahoma counties. By 1979, they were verified in eight counties and remaining population fragments totaled an estimated range of 2,791 square kilometers (1,078 square miles), a decrease of approximately 72 percent since 1944. At present, the Oklahoma Department of Wildlife Conservation (ODWC) reports lesser prairie-chickens in eight counties with an estimated occupied range of approximately 950 square kilometers (367 square miles). The 2000 lesser prairie-chicken population was estimated at fewer than 3,000 birds throughout the state (Horton 2000). In Oklahoma, the lesser prairie-chicken is considered an upland game bird, although the harvest season has been closed since 1998. Long-term abundance estimates suggest a history of dramatic population fluctuations. Between 1968 and 2000, mean number of males per active lek ranged from a high of 16.5 in 1975 to a low of 4.6 in 2000. Between 1987 and 2000, estimated density of leks within occupied habitat ranged from a high of 0.33 leks per square mile in 1988 to a low of 0.06 leks per square mile in 1997.

Eleven historical lesser prairie-chicken lek sites were surveyed in 2005, only six of which had chickens present. These six leks yielded a total of 46 birds. This represents a 10% decrease from the 51 birds flushed from 8 leks in 2004. The mean number of birds/active lek decreased from 7.7 birds/active lek in 2004 to 7.5 birds/active lek in 2005, and the number of active display grounds located decreased from 16 in 2004 to 11 in 2005 (ODWC 2005).

Survey routes to estimate the density of leks were run in Beaver, Harper, Texas, Woods, and Woodward Counties. The nine leks found (0.075 leks/square mile) represents an 80% increase when compared with 2004 findings. However, ODWC noted that the Ellis county survey route (which usually yields 0 leks located) was not run during 2005. Assuming a lek density of 0 leks/20 mi^2, however, and including this figure in the analysis, the lek density still increased 50% over the 2004 finding. While 2005 surveys were generally improved over 2004, ODWC reports that data collected to date illustrates an alarming long term downward trend in population indices in all counties. These data suggest not only the necessity of continuing to monitor prairie chicken populations, but also suggest a need to refine prairie chicken management objectives on a range-wide basis (ODWC 2005).

In cooperation with ODWC, Service personnel in 2005 attempted to quantify the degree of threat from wind power development to existing populations of lesser prairie-chicken in Oklahoma. Using ArcView mapping software, all documented lek locations in the state were compared with the perimeter of occupied range for the species and all remaining untilled native rangeland in Oklahoma. Finally, these maps were compared with the Oklahoma Neural Net Wind Power Development Potential Model (Neural model) map created by the Oklahoma Wind Power Assessment (OWPA) project. The resulting data were as follows. Of the remaining occupied range in the state, 34.7% fell within areas designated as "excellent", and 55.4% fell within areas designated as both "good" and "excellent" for commercial wind power development. Currently, 51out of 96 (53.1%) of known leks occur within 1 mile of land classified as "excellent" for development by OWPA's Neural model.

The Service's *Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines,* released in July 2003, (http://www.fws.gov/habitatconservation/wind.pdf), summarizes research indicating that prairie grouse populations may avoid or abandon habitats a great distance from where commercial wind turbines and high voltage transmission lines are constructed. As a result, the Service recommends that wind turbines not be constructed within 5 miles of known lek sites for populations of prairie grouse that are at significant conservation risk. This position is further explained and supported in a Service briefing document providing justification for the 5-mile setback recommendation (Manville 2004). Currently, 87 out of 96 (90.6%) of known Oklahoma lesser prairie-chicken leks occur within 5 miles of land classified as "excellent" for wind development by OWPA's Neural model (Oklahoma Ecological Services Field Office – C. O'Meilia, pers. comm.). To date only one commercial wind power facility has been constructed within occupied lesser prairie-chicken range in the state. However, a recent map of anticipated transmission facility upgrades and wind power development projects was provided to the Service and others by the Southwest Power Pool, an organization of power distributors in the southwestern states. This map identifies approximately 263 miles of new transmission line construction in Oklahoma and six proposed, but previously unknown wind power projects within lesser prairie-chicken range in Oklahoma (R. Walker, pers. comm. Southwest Power Pool

Workshop, National Wind Coordinating Committee Transmission and Wind Energy Meeting, Topeka, KS, Sept. 19, 2005).

Texas - Systematic surveys of the number of Texas counties where lesser prairie-chickens occur began in 1940 (Henika 1940; Texas Game, Fish, and Oyster Commission 1945; Litton 1978). Annual surveys to determine population trends of lesser prairie-chickens in Texas were initiated in 1952 (Lionberger 2005). From the early (Henika 1940, Sullivan et al. 2000) to mid (Texas Game, Fish, and Oyster Commission 1945; Litton 1978)1940's to the early 1950's (Seyffert 2001), it is estimated that the range of the lesser prairie-chicken in Texas encompassed portions of 34 counties. Researchers considered the occupied range at the turn of the 20th century (1940-1950) to be a reduction from the historical range. In 1989, Texas Parks and Wildlife Department (TPWD) produced an occupied range map that encompassed portions of 12 counties (Sullivan et al. 2000). In 2005, TPWD reported that the number of occupied counties likely is unchanged from the 1989 estimate.

In Texas, the lesser prairie-chicken is classified as an upland game bird. In 2005, TPWD Commission approved changes to the hunting season. Beginning with the fall 2005 season, there will be no open season for lesser prairie-chicken except on properties for which TPWD has approved a wildlife management plan that contains a component specifically addressing the management of lesser prairie-chicken. The open season is the third Saturday in October for two consecutive days; daily bag limit is two lesser prairie-chickens and possession limit is four. The TPWD-approved wildlife management plan will include 1) a lesser prairie-chicken population estimate for the current year; 2) accurate harvest data from the property for the initial hunting season and each season thereafter that the landowner seeks to hunt lesser prairie-chicken on the property; 3) a biological evaluation of the quality of existing prairie-chicken habitat and the potential for enhancing existing habitat or creating additional habitat; 4) at least five TPWD-recommended habitat management practices designed to increase, enhance, or connect lesser prairie-chicken habitat; and 5) a recommended harvest not to exceed five percent of the estimated lesser prairie-chicken population on the property.

No recent estimates of population size in Texas are published. In April 2005, the TPWD staff conducted lesser prairie-chicken lek surveys on Study Areas in the Permian Basin/Western Panhandle (Study Areas in Bailey, Yoakum, and Gaines counties) and in the Northeastern Panhandle (Study Areas in Gray, Hemphill, and Wheeler counties). All Study Areas are located on private land; all Study Areas have been surveyed since at least 1999 . The Permian Basin/Western Panhandle surveys estimated 7.7 males/lek and the lek density was estimated at 0.31 leks/square mile. The Northeastern Panhandle surveys estimated 8.3 males/lek with an estimated lek density of 0.34 leks/square mile (Lionberger 2005). The TPWD reports the 2005 surveys indicate a stable to declining trend for the lesser prairie-chicken population in the northeastern panhandle (Whitlaw and DeMaso, personal comm., Lesser prairie-chicken Interstate Working Group Minutes, 2005).

During spring 2004, the TPWD staff and project partners (i.e., Natural Recourses Conservation Service (NRCS) and Forest Service personnel) conducted standardized road surveys to improve lesser prairie-chicken distribution data. A total of 41 routes were driven (652 miles) in 15 different

counties between 30 March and 29 April, 2004. Possible lesser prairie-chickens were seen or heard at three locations (Andrews Co. [private land], Deaf Smith Co, and Terry Co.); confirmed lesser prairie-chickens were reported from three additional locations (one in Cochran Co. and two in Gray Co.). Prior to these standardized road survey efforts (2001-2003), additional leks had been recorded opportunistically when heard near Study Areas or during searches for leks outside of study areas. Leks detected during these types of surveys were recorded to document distribution outside Study Areas, but were not counted for strutting males. Driving routes were conducted in the Northeastern Panhandle during 2001-03 (one route in each of Donley-Gray, Collingsworth, and Hemphill counties). Lek surveys were also conducted during 2001 to 2003 from listening points in Yoakum, Gaines, Andrews, Cochran, and Bailey counties.

THREATS

A. The present or threatened destruction, modification, or curtailment of its habitat or range.

Habitat Destruction - Conversion of native sand sagebrush and shinnery oak rangeland to areas of cultivation is cited by many authors as an important factor in the decline of lesser prairie-chickens (Copelin 1963, Jackson and DeArment 1963, Crawford and Bolen 1976, Crawford 1980, Taylor and Guthery 1980, Braun et al. 1994, Lesser Prairie-chicken Interstate Working Group 1997). Between 1915 and 1925, many new acres of prairie sod were plowed on the Great Plains to grow needed wheat (Laycock 1987). By the 1930s, Bent (1932) speculated that extensive cultivation or overgrazing had begun to cause the species to disappear from sections where it had been abundant. Because grain crops increased winter food supply, the initial conversion of some native prairie to cultivation may have been beneficial to the species. However, areas with greater than 20 to 37 percent cultivation may be incapable of supporting stable populations (Crawford and Bolen 1976). In the 1940s, 1970s, and 1980s, additional acres of previously unbroken grassland were plowed (Laycock 1987).

Bragg and Steuter (1996) estimated that in 1993, only 8 percent of the bluestem-grama association and 58 percent of the mesquite-buffalo grass association as described by Kuchler (1985) remained. The remaining mixed-grass prairie vegetation differs from pre-settlement conditions. The present grazing, fire, and water management regimes are vastly different and less variable, cultivated cropland has been added, and the amount of woodland habitat has expanded (Knopf and Samson 1997).

Recent loss of native rangeland within the range of the lesser prairie-chicken was determined using the National Resources Inventory of the NRCS. The 1992 National Resources Inventory Summary Report provided estimates of change in rangeland acreage, between 1982 and 1992, for each state. When considered state-wide, each of the five states with lesser prairie-chickens showed a decline in the amount of rangeland acreage over that time period, indicating that loss of habitat may still be occurring. However, estimates of rangeland between 1982 and 1992 for counties specifically within lesser prairie-chicken range showed no statistically significant change, possibly due to small sample size and large variance estimates. No analysis of native rangeland losss within lesser prairie-chicken range has been conducted since 1992. However, biologists have noted a large increase in the frequency of confined animal feeding operations

(CAFOs) for swine and dairy cattle production. These operations generally result in concurrent conversion of nearby native rangeland to center-pivot agricultural fields to allow the distribution of animal effluent and/or provide higher-quality forage. The extent of habitat loss to CAFOs since 1992 is as yet undetermined.

Habitat Modification (Grazing and Fragmentation) - Grazing has always been an ecological force within the Great Plains ecosystem. The evolutionary history of the mixed-grass prairie resulted in endemic bird species adapted to a mosaic of lightly to severely grazed areas (Bragg and Steuter 1996, Knopf and Samson 1997). We believe that areas of heavily, moderately, and lightly grazed areas are necessary on a landscape scale. In some areas within lesser prairie-chicken range, insufficient amount of lightly grazed habitat is available to support successful nesting (Crawford 1980, Jackson and DeArment 1963, Davis et al. 1979, Taylor and Guthery 1980, Davies 1992). Uniform or widespread livestock grazing of rangeland to a degree that leaves less than adequate residual cover remaining in the spring is considered detrimental to lesser prairie-chicken populations (Bent 1932, Davis et al. 1979, Cannon and Knopf 1980, Crawford 1980, Bidwell and Peoples 1991, Riley et al. 1992, Giesen 1994b), because grass height is reduced below that necessary for nesting cover and desirable food plants are markedly reduced. Superior cover at and around nests is thought to increase nest success because the nest is better concealed from predators (Davis et al. 1979, Wisdom 1980, Riley et al. 1992, Giesen 1994b). When grasslands are in a deteriorated condition due to overgrazing, the soils have less water-holding capacity, and the availability of succulent vegetation and insects are reduced. Thus, the effects of overgrazing are likely exacerbated by drought (Davis et al. 1979, Merchant 1982).

In summary, livestock grazing is not necessarily detrimental to lesser prairie-chickens. However, a level of grazing that leaves little cover in the spring for concealment of prairie-chicken nests is detrimental. In some areas, limited brush control may be warranted, but widespread eradication of brush to increase forage for livestock can result in a lack of shrub cover for lesser prairie-chickens which is also detrimental. Because the lesser prairie-chicken depends on medium and tall grasses that are preferred by cattle in regions of low rainfall, its habitat is easily overgrazed (Hamerstrom and Hamerstrom 1961). To be favorable to lesser prairie-chickens, grazing management must ensure that a diversity of plants and cover types remain on the landscape (Taylor and Guthery 1980).

Because suitable habitat for lesser prairie-chickens has been lost due to conversion to agriculture and modified through grazing practices and other factors, much of the remaining suitable habitat is fragmented (Crawford 1980, Braun et al. 1994). Fragmentation may exacerbate the extinction process (Wilcove et al. 1986) through several mechanisms: remaining fragments may be smaller than necessary home range size (Samson 1980); necessary habitat heterogeneity may be lost; habitat between patches may house high levels of predators or brood parasites; and the probability of recolonization decreases as distance from nearest patch increases (Wilcove et al. 1986, Knopf 1996). As a group, grouse may be relatively intolerant of extensive habitat fragmentation due to their short dispersal distances and other life history characteristics such as specialized food habits and generalized anti-predator strategies (Braun et al. 1994).

An emerging but potentially severe threat to remaining lesser prairie-chicken populations is the

recent and large-scale potential for of commercial wind turbine development, particularly in western Kansas, Oklahoma and Texas. Preliminary mapping analyses comparing proposed wind power sites and known lesser prairie-chicken leks in Oklahoma indicate nearly complete overlap on all occupied habitats. Most large remaining tracts of untilled native rangeland, and hence lesser prairie-chicken leks, occur on topographic ridges. Because of the increased elevation, these ridges offer excellent wind resources for development. Ongoing telemetry research on lesser prairie-chickens (Robel 2002) and sage grouse (F. Hall, pers. comm.) indicate that prairie grouse exhibit strong avoidance of tall vertical features such as utility transmission lines. Robel (2002) estimates that a single commercial-scale wind turbine may create a habitat avoidance zone for greater prairie-chickens that extends as far as one mile from the structure. Efforts to quantify the magnitude and immanency of this threat rangewide are currently underway.

B. Overutilization for commercial, recreational, scientific, or educational purposes. In the late 19th century, lesser prairie-chickens were subject to market hunting (Jackson and DeArment 1963). Harvest has been regulated since approximately the turn of the century (Crawford 1980). Currently, the lesser prairie-chicken is classified as a game species in Kansas, New Mexico, Oklahoma, and Texas, although the legal harvest is now closed in New Mexico and Oklahoma.

The Service does not attribute over utilization through recreational hunting as a primary cause of lesser prairie-chicken population declines. However, because most remaining lesser prairie-chicken populations are small, isolated, and naturally exhibit a clumped distribution on the landscape, they are likely vulnerable to local extirpations through many mechanisms including human harvest. Given all currently available scientific information, the Service cannot determine if current levels of recreational harvest in Kansas limit population recovery or contribute to its overall decline but above (under current status in Kansas) we said that hunting pressure was minimal. New 2005 harvest regulations in Texas, which prohibit hunting except on lands with an established conservation plan for the species, and which limit maximum harvest to no more than five percent of the annual estimated population clearly protect the species from over-harvest and create incentives for habitat improvement. Braun et al. (1994) called for definitive experiments that evaluate the extent to which hunting is additive at different harvest rates and in different patch sizes. In the interim, they suggested conservative harvest regimes for small or fragmented populations because fragmentation likely decreases the resilience of populations to harvest.

One new factor that has the potential to negatively effect individual populations is the growing occurrence of public and guided bird watching tours of leks during the breeding season. The site-specific impact of recreational observations of lesser prairie-chickens at leks is currently unknown. However, disturbance effects are likely to be minimal at the population level if disturbance is avoided by observers remaining in vehicles or blinds until lesser prairie-chickens naturally disperse from the lek and observations are confined to a limited number of days and leks. Solitary leks comprised of fewer than 10 males are most likely to be affected by repeated recreational disturbance. Research is needed to quantify this potential threat to local populations of lesser prairie-chickens.

C. Disease or predation. Giesen (1998) reported no available information on ectoparasites or infectious diseases in lesser prairie-chickens, although several endoparasites including

nematodes and cestodes are known to infect the species. In the spring of 1997, a sample of 12 lesser prairie-chickens from Hemphill county, Texas, were captured and tested for the presence of disease and parasites. No evidence of viral or bacterial diseases, hemoparasites, parasitic helminths, or ectoparasites was found (J. Hughes, TPWD, *in litt*., August 26, 1997). The significance of the parasite infestations noted in the literature is unknown. The Lesser prairie-chicken Interstate Working Group (1997) concluded that while density-dependent transmission of disease was unlikely to have a significant effect on lesser prairie-chicken populations, a disease that was transmitted independently of density could have drastic effects.

It is unknown what impact West Nile Virus (WNV) may have on lesser prairie-chickens. Ruffed grouse (*Bonaso umbellus*) have been documented to harbor WNV infection rates similar to some corvids. For 130 ruffed grouse tested in 2000, all away from known WNV epicenters, 27 (21%) tested positive. This was remarkably similar to both American crows and blues jays (23% for each species), species with known susceptibility to WNV (Bernard et al. 2001). Recent analysis on the degree of threat to prairie grouse from parasites and infectious disease concludes that microparasitic infections that cause high mortality across a broad range of galliform hosts have the potential to extirpate small, isolated prairie grouse populations (Peterson 2004). Non-parasitic diseases caused by mycotoxins, pesticides, and other toxic toxic compounds have the potential to influence population dynamics. Further research is recommended to establish whether parasites regulate prairie grouse populations as has been observed in red grouse. Peterson (2003) urges that natural resource decision makers be aware that macro- and micro-parasites cannot be safely ignored as populations such as lesser prairie-chicken become smaller, more fragmented, and increasingly vulnerable to the effects of disease.

Prairie falcon (*Falco mexicanus*), northern harrier (*Circus cyaneus*), great-horned owl (*Bubo virginianus*), unidentified raptors, and coyote (*Canis latrans*) have been identified as predators of lesser prairie-chicken adults and chicks (Copelin 1963, Davis et al. 1979, Merchant 1982, Haukos and Broda 1989, Giesen 1994b). Predators of nests and eggs also include Chihuahuan raven (*Corvus cryptoleucus*), striped skunk (*Mephitis mephitis*), ground squirrels (*Spermophilus spilosoma*) and bullsnakes (*Pituophis melanoleucus*), as well as coyotes and badgers (*Taxidea taxus*) (Davis et al. 1979, Giesen 1998).

Predation on lesser prairie-chickens is especially important relative to nest success. Nest success and brood survival of greater prairie-chickens accounted for most of the variation in population finite rate of increase (Wisdom and Mills 1997). Thus, to have the greatest effect on population growth, management for greater prairie-chickens should focus on improving nest success and brood survival. To our knowledge, a similar analysis has not been completed for the lesser prairie-chicken, but we expect that survival of the zero age class is important for all prairie grouse. Bergerud (1988) concluded that population changes in many grouse species are driven by changes in breeding success; this conclusion was supported by an analysis of Attwater's prairie chicken (*T. c. attwateri*) (Peterson and Silvy 1994).

The community of prairie mammals has undergone a significant reconstruction due to destruction of habitat, decimation of keystone species and top predators, and the increase in generalist and introduced animals (Benedict et al. 1996). Habitat generalist species such as the coyote, red fox (*Vulpes fulva*), gray fox (*Urocyon cinereoargenteus*), and raccoon (*Procyon*

lotor) may all have increased in population size or range size since European settlement (Bowles 1981, Jones et al. 1983, Caire et al. 1989, Benedict et al. 1996). The initial reduction of large canids of the Great Plains may have been responsible for an increase in medium-sized predators such as skunk, raccoon, and fox, which are known to cause low duck nest success in the northern Great Plains (Sargeant et al. 1984, Garrettson et al. 1996). As habitat fragmentation increases, the effects of terrestrial nest predators may increase (Braun et al. 1978). The Lesser Prairie-chicken Interstate Working Group (1997) reported that two ongoing studies of prairie grouse, in Kansas and Oklahoma, have shown a very high rate of nest failure due to predators.

D. The inadequacy of existing regulatory mechanisms. In 1973, the lesser prairie-chicken was listed as threatened in Colorado under the "Nongame and Endangered or Threatened Species Conservation Act". In July of 1997, the NMDGF received a formal request to commence an investigation into the status of the lesser prairie-chicken within New Mexico. This request was the beginning of the process for potential listing of this species under New Mexico's Wildlife Conservation Act. At the November, 1999 Game Commission meeting, the Director withdrew his recommendation to list the lesser prairie-chicken as a threatened species under the Wildlife Conservation Act until more information was collected from landowners, lessees, and land resource managers who may be effected by the listing or who may have information pertinent to the investigation. Regardless of any state listings, most occupied lesser prairie-chicken habitat throughout its current range occurs on private land (Taylor and Guthery 1980), where states have little authority to protect the species or its habitat, with the exception of setting harvest regulations.

The National Forest Management Act (NFMA) (36 CFR Ch. 11, Section 219.19), requires that the Forest Service identify species as management indicator species if their population changes are believed to indicate the effects of management activities. According to NFMA, planning alternatives should be evaluated in terms of population trends of management indicator species, and biologists from state and federal agencies should be consulted to coordinate planning. In Region 2 of the Forest Service, the Pike and San Isabel National Forests, Comanche and Cimarron National Grassland Land and Resource Management Plan designates the lesser prairie-chicken as a management indicator species and contains specific standards and guidelines for lesser prairie-chicken habitat management. The current standards and guidelines apply wherever lesser prairie-chickens occur on these national grasslands (J. Hartman, in litt., April 25, 1997). The guidelines direct Forest Service to: maintain range with a diversity of plant forms, promote mid-seral to potential natural community plant species, protect all lesser prairie-chicken leks from surface disturbance at all times, protect nesting habitat from surface disturbance from April 15 to June 30, and limit livestock and wild herbivore allowable forage use in lesser prairie-chicken habitat to 40 percent (J. Hartman, in litt., April 25, 1997). As stated in the Oil and Gas Leasing Environmental Impact Statement for the Comanche and Cimarron National Grasslands, no surface use is allowed in "prairie chicken dancing grounds and nesting areas" between March 1 and June 1 (J. Hartman, in litt., April 25, 1997).

The other federal land occupied by lesser prairie-chickens is administered by the BLM in New Mexico. The lesser prairie-chicken has no official special status on land administered by BLM (E. Roberson, BLM, *in litt*., Jan. 12, 1998). The majority of currently occupied lesser prairie-chicken habitat is within the Roswell BLM Resource Area. However, the Carlsbad BLM

Resource Area comprised much of the historic southern periphery of the species range in New Mexico. In October, 1997 the Roswell Approved Resource Management Plan and Record of Decision were signed (BLM 1997a). Drilling and 3-D geophysical exploration will not be allowed in lesser prairie-chicken habitat between March 15 and June 15 each year. During that period, other activities that produce noise or involve human activity will be not allowed between 3:00 and 9:00 am; this does not include normal, around-the-clock operations. No new drilling will be allowed within 200 meters of all known leks, although exceptions to these requirements will be considered for areas of no or low prairie-chicken booming activity, or unoccupied habitat, including leks, as determined at the time of permitting, or in emergency situations (BLM 1997a, App. 1). Because lesser prairie-chickens generally nest within a 3 km radius of a lek, restrictions on drilling within 200 meters will not protect all or even a majority of nesting habitat. Similar protective measures were initiated on the Carlsbad BLM Resource Area, which has exhibited greater oil and gas activity than the Roswell BLM Resource Area in the past. Any protective restrictions on BLM areas are tied to documented lesser prairie-chicken activity on local leks. Due to the recent extirpation of nearly all lesser prairie-chicken populations and active leks south of highway 380 in New Mexico, including the Carlsbad BLM Resource Area, the BLM proposed in March, 2002, to provide "blanket exceptions" to oil and gas restrictions within large portions of previously occupied habitat. As a result, previous restrictions on timing, noise and development activities near traditional leks have been lifted indefinitely, barring new documentation of lesser prairie-chicken activity on leks within blanket exception areas. The Service is concerned that unrestricted disturbance and landscape fragmentation within large remaining tracts of undeveloped BLM property, coupled with excessive grazing utilization and further weakening of existing policies may preclude population recovery on BLM lands in southeastern New Mexico.

Because only five percent of the species' overall range occurs on Federal lands, the Service recognizes that the lesser prairie-chicken cannot be fully recovered on Federal lands alone. However, no laws or regulations currently protect lesser prairie-chicken habitat on private lands. Therefore, the Service views habitat management considerations on Federal lands within existing lesser prairie-chicken range as important conservation efforts for the species.

Finally, the recent, although limited, construction of commercial wind energy projects near and within occupied lesser prairie-chicken habitat in Oklahoma, Colorado, Texas and New Mexico has raised concerns about potential negative affects such projects may have on the species if constructed at large scales in occupied habitat. Information the Service has received from local citizens, community leaders, state wildlife agencies, private conservation groups, and wind power development advocates indicate that a rapid expansion of wind energy projects throughout large portions of occupied lesser prairie-chicken range is likely. This may be due, in part, to existing tax incentives for wind development that encourage rapid site construction prior to expiration of statutory incentive deadlines. Because most wind development activities are privately funded on private land, and therefore outside the purview of the National Environmental Policy Act, the framework of current tax incentives may further reduce the opportunity for timely and appropriate environmental review by state and local conservation entities.

The life cycles of prairie grouse require large expanses of unfragmented, ecologically healthy

rangelands (Flock 2002). Intact expanses of mixed-grass, short-grass, and sage-brush prairie are essential to the lesser prairie-chicken (Bidwell et al. 2002, Giesen 1998). An increasing body of research indicates that, by causing general habitat avoidance and displacement, vertical features and structural habitat fragmentation may have negative impacts on the lesser prairie-chicken as well as other grassland obligate species.

Leks, the traditional mating grounds of prairie grouse, are consistently located on elevated grassland sites with few vertical obstructions (Flock 2002). These are often preferred sites for wind generation facilities. Many ground-dwelling birds appear to be sensitive to elevated structures in their otherwise relatively flat habitats. Grassland birds including some species whose populations are declining seriously, avoid trees, buildings, power poles, and other elevated structures that can serve as raptor perches. Three grassland bird species have been documented to avoid areas within 100 meters of wind turbines (Leddy et al. 1999).

Similar effects of elevated structures have been identified regarding lesser prairie-chicken, with no nesting or brood rearing within 300 meters of power lines. In addition, a recent study found no nesting or lekking within one-half mile of a gas line compressor station. Lesser prairie-chickens generally avoid human activity and seldom nest within one-quarter mile of inhabited dwellings, and the birds have been shown to avoid a one-mile radius of a coal-fired power plant (Robel 2002**).**

Given these findings, the Service is concerned about the current lack of regulatory oversight and public notice requirements for the purchase of wind rights and construction of wind generation facilities. Specifically, we are unaware of any state or federal mechanisms that require potential wind producers to disclose the location, size, and anticipated construction date for pending projects. Without this information, the Service currently has little ability to quantify the degree of threat from wind power development to the species.

E. Other natural or manmade factors affecting its continued existence. Drought is considered a universal ecological driver across the Great Plains (Knopf 1996). Infrequent, severe drought may cause local extinctions of annual forbs and grasses that have invaded stands of perennial species and recolonization of these areas may be slow (Tilman and El Haddi 1992). In this way, drought may impact lesser prairie-chickens through its effect on seasonal growth of vegetation necessary to provide nesting and roosting cover, food, and escape from predators (Merchant 1982, Peterson and Silvy 1994, Morrow et al. 1996). The sensitivity of lesser prairie-chickens to drought was discussed by Crawford (1980) and Hamerstrom and Hamerstrom (1961); home ranges may be larger in drought years (Copelin 1963, Merchant 1982), and recruitment may be less likely after drought years (Merchant 1982, Morrow 1986, Giesen 1998). Along with other prairie grouse, this species has a high reproductive potential in years of adequate conditions. Thus, drought conditions are unlikely to be the sole causative factor in long-term lesser prairie-chicken population declines, although the effects of drought on population growth rate may exacerbate the extirpation risk of small, fragmented populations.

Ring-necked pheasant (*Phasianus colchicus*) hens have been documented parasitizing nests of several species, including greater prairie-chicken (Vance and Westemeier 1979, Kimmel 1987, Westemeier et al. 1989). Consequences of nest parasitism vary, and may include abandonment

of the host nest, reduction in number of host eggs, lower hatching success, and parasitic broods (Kimmel 1987). Predation rate may increase with incidence of parasitism (Vance and Westemeier 1979). Further consequences are hypothesized to include the imprinting of the pheasant young from the parasitized nest to the host species, and later attempts by male pheasants to court females of the host species (Kimmel 1987). Male pheasants have been observed disrupting the breeding behavior of greater prairie-chickens on leks (Sharp 1957, Follen 1966, Vance and Westemeier 1979). In addition, pheasant displays toward female prairie-chickens almost always cause the female to leave the lek (Vance and Westemeier 1979). Thus, an attempt by a pheasant to display on a prairie-chicken lek would completely disrupt the normal courtship activities of prairie-chickens.

To our knowledge, no published reports of pheasant harassment or parasitism exist for lesser prairie-chickens, although wildlife biologists from KPWD, ODWC, TPWD, and the Oklahoma Cooperative Fish and Wildlife Research Unit have given numerous anecdotal accounts. Competition with and parasitism by pheasants may be a potential factor that could negatively affect lesser prairie-chicken populations at the local level. More research is needed to understand and quantify impacts of pheasants on lesser prairie-chicken populations.

To date, no studies have been conducted examining potential effects of agricultural pesticide use on lesser prairie-chicken populations. Of approximately 200 sage grouse (*Centrocercus urophasianus*) known to be feeding in a block of alfalfa sprayed with dimethoate, 63 were soon found dead, and many others exhibited intoxication and other negative symptoms (Blus et. al. 1989). Because lesser prairie-chicken are known to selectively feed in alfalfa fields throughout their range, we believe there may be just cause for concern that similar impacts may be occurring. No research or anecdotal information is currently available in this regard. Therefore, the Service is inquiring further into potential ongoing threats caused by organophosphorus insecticide use within occupied range, and solicits input from all parties who may be knowledgeable about such effects.

Woody invasion of historic prairie habitats is of growing concern to the Service, State Wildlife agencies, and other conservation entities throughout the southern high plains. As an example, the rate of spread of the eastern red cedar tree (*Juniperus virginianus*) in Oklahoma was evaluated in 1994 by Oklahoma State University and the Oklahoma Cooperative Extension Service. Their analysis indicated that by 1995, eastern red cedar invasion alone would consume approximately 762 acres of rangeland habitats in Oklahoma each day, amounting to over 300,000 acres annually (T. Bidwell pers. comm.). Because these analyses were conducted nearly a decade ago, the Service is eager to quantify the current degree and rate of woody encroachment into currently occupied lesser prairie-chicken habitat.

Finally, the sympatric occupation of habitat and leks by greater and lesser prairie-chickens in central Kansas may pose a potential threat to the species. Historical records document that the species' ranges overlapped considerably, but that habitat partitioning was clearly evident based on the abundance of sand-adapted vegetation. The relative frequency of natural hybridization prior to European settlement can only be speculated. Because current populations north of the Arkansas river in Kansas are generally characterized as low density and very dependent upon the residual habitat structure of fragmented tracts of CRP projects, those populations may be

ephemeral depending on implementation of CRP projects and stochastic environmental factors. Low population density may also increase the susceptibility of lesser prairie-chickens to hybridization and exacerbate the potentially negative effects of hybridization. To date, the fertility of hybrid individuals throughout filial generations has not been rigorously tested. The immediate and long-term influence of hybridization on the species is unknown and warrants investigation.

CONSERVATION MEASURES PLANNED OR IMPLEMENTED: The TPWD hosted a series of landowner meetings and listening sessions in six counties (Hemphill, Wheeler, Gray, Bailey, Cochran, and Gaines) during March 2005. Private landowners and the general public were invited to discuss lesser prairie-chicken conservation and management, receive information, and provide input on programs and incentives that are available for managing lesser prairie-chickens on privately owned habitats. A total of 70 landowners attended the meetings (30 in Hemphill Co., 13 in Wheeler Co., 8 in Gray Co., 7 in Bailey Co., 9 in Cochran Co., and 3 in Gaines Co.). Comments received by TPWD and meeting partners (i.e., Service, NRCS, Farm Services Agency (FSA)) continue to be compiled; however, discussions among the majority of those who attended addressed outreach and education, NRCS and FSA-administered programs (e.g., Environmental Quality Incentive Program (EQIP), CRP), land use practices and traditions, data reporting, habitat-related impacts to lesser prairie-chicken populations, and research needs. In response to these meetings, TPWD is working with the Service and landowners in drafting a candidate conservation agreement with assurances (CCAA) for lesser prairie-chickens in Texas.

The TPWD continues to fund several lesser prairie-chicken research projects. In conjunction with several Texas universities, TPWD is evaluating the use of aerial line transects and forward-looking infrared technology to survey lesser prairie-chickens; TPWD is also providing initial funding and coordination support for development of a spatially explicit population viability analysis for lesser prairie-chickens. Other ongoing research includes evaluation of lesser prairie-chicken population response to shinnery oak treatments, and evaluation of the relationship among lesser prairie-chickens, raptors, and oil-gas infrastructure.

As part of the Species Conservation Project of the Rocky Mountain Region, the Forest Service recently completed a Technical Conservation Assessment for the lesser prairie-chicken (Robb and Schroeder 2005). This comprehensive document can be found on the web at: http://www.fs.fed.us/r2/projects/scp/assessments.

Recently it has been announced that approximately 12-25 square miles of center pivot agriculture in the vicinity of Garden City, Kansas may soon be retired and restored to mixed grassland as a result of Sunflower Electric, Inc. purchasing the existing water rights for those properties. This could result in a significant increase in prime habitat within highly valuable portions of the species range. In addition, KDWP is pursuing the development of a Conservation Reserve Enhancement Project through the U.S. Department of Agriculture that would further retire center pivot irrigation along the Arkansas River corridor (R. Rodgers, pers. comm., Lesser prairie-chicken Interstate Working Group meeting minutes, 2005.)

In southeastern New Mexico, a stakeholder group was initiated in early 2003 to address concerns about BLM land use policy relative to declining lesser prairie-chicken and sand dune lizard

(*Sceloporus arenicolus*) populations and increased demand for energy exploration and development. The group's aim is to achieve balanced land use while conserving sensitive species and the shinnery oak/bluestem ecosystem on BLM lands in NM. The group's planning efforts are now complete, and if fully implemented, their Conservation Strategy has the potential to generate significant benefits to the lesser prairie-chicken long term on BLM, state-owned, and private lands in New Mexico.

Also in New Mexico, NMDGF, the Department of Energy and the Service, with others, are collaborating to develop a CCAA between the Service and the Center of Excellence for Hazardous Material Management for the lesser prairie-chicken on federal lands administered by DOE's Waste Isolation Pilot Project. In the near future, the group proposes to establish a captive propagation facility for the eventual release of lesser prairie-chicken on both federal and participating private lands in Lea and Eddy counties where the species is currently extirpated.

Finally, much attention has been directed to the decline of prairie grouse nationwide, as evidenced through special sessions, symposia, and solicited publications throughout professional conservation arenas. In particular, the spring 2004 edition of the Wildlife Society Bulletin contains a host of publications relevant to current lesser prairie-chicken management, including formal guidelines for management of the species and its habitats (Hagan et. al. 2004). In addition, the North American Grouse Partnership, in cooperation with the National Fish and Wildlife Foundation and multiple state wildlife agencies, have embarked on the writing of the prairie grouse portions of an overarching North American Grouse Management Strategy. This strategy would provide clear recovery actions and the necessary funding to achieve management goals for all species of grouse in North America. The Strategy is expected to be complete in November 2007. The Service views the increased emphasis and exposure for prairie grouse, and the lesser prairie-chicken in particular, as positive for the conservation and recovery of the species.

Active research into the biology, habitat, and recovery of the lesser prairie-chicken is ongoing in all states within occupied range. These research projects address critical questions to the recovery of the lesser prairie-chicken and contribute to the net conservation of the species.

SUMMARY OF THREATS: Although livestock grazing is not necessarily detrimental to lesser prairie-chickens, a level of grazing that leaves little cover in the spring for concealment of prairie-chicken nests is detrimental. Suitable habitat for lesser prairie-chickens has been lost due to conversion to agriculture and modified through grazing practices and other factors and much of the remaining suitable habitat is fragmented (Crawford 1980, Braun et al. 1994). An emerging but potentially severe threat to remaining lesser prairie-chicken populations is the recent and large-scale potential for of commercial wind turbine development, particularly in western Kansas, Oklahoma and Texas. One new factor that has the potential to negatively effect individual populations is the growing occurrence of public and guided bird watching tours of leks during the breeding season. It is unknown what impact WNV may have on lesser prairie-chickens. Lastly, drought may impact lesser prairie-chickens through its effect on seasonal growth of vegetation necessary to provide nesting and roosting cover, food, and escape from predators (Merchant 1982, Peterson and Silvy 1994, Morrow et al. 1996).

For species that are being removed from candidate status:

___Is the removal based in whole or in part on one or more individual conservation efforts that you determined met the standards in the Policy for Evaluation of Conservation Efforts When Making Listing Decisions (PECE)?

LISTING PRIORITY

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
High	Imminent	Monotypic genus	1
		Species	2
		Subspecies/population	3
	Non-imminent	Monotypic genus	4
		Species	5
		Subspecies/population	6
Moderate to Low	**Imminent**	Monotypic genus	7
		Species	**8***
		Subspecies/population	9
	Non-imminent	Monotypic genus	10
		Species	11
		Subspecies/population	12

Rationale for listing priority number:

Magnitude: We have determined that the overall magnitude of threats to the lesser prairie-chicken throughout its range is moderate. The magnitude of threats to lesser prairie-chicken rests primarily on the quality and scale of remaining habitat. At present, irreversible habitat destruction due to development, agriculture, industrial, or similar activities are minimal, and insignificant throughout the entire range. Therefore, we must rank the magnitude of threats to the species as moderate rather than high. However, foreseeable threats due to indirect habitat degradation through the effects of human-caused habitat fragmentation are increasing. Specifically, woody invasion of native prairies and CRP fields by eastern red cedar and other trees and shrubs throughout occupied range in Oklahoma, Kansas, New Mexico and Texas poses a serious threat to the survival of the species. If left unchecked, slow habitat degradation due to plant succession, further exacerbated by human fire suppression, will undoubtedly render most of the species range uninhabitable in these states within the foreseeable future. The Service and its partners are beginning efforts to quantify the degree and rate of woody invasion within occupied habitat. At present, all states and conservation agencies within occupied range are committing a substantial portion of their resources via personnel, outreach, and habitat improvement incentives to landowners to optimize habitat in currently occupied range and adjacent lands.

Finally, the Service recognizes that measurable increases in populations often come years after

certain habitat improvements, coupled with favorable weather conditions, occur. Therefore, we are not elevating the listing priority, based on magnitude of threats, above the existing listing priority number of 8. However, the Service has begun efforts to formally quantify the magnitude of emerging habitat fragmentation threats, in the form of commercial wind power and appurtenant facilities, habitat invasion by woody species, and extensive oil and gas exploration and development. The results of this analysis will be considered in the next candidate assessment for the species.

Imminence: The majority of threats to remaining lesser prairie-chicken populations are ongoing, thus they are considered imminent. We maintain that remaining populations are becoming increasingly fragmented and vulnerable to stochastic environmental impacts. This is particularly true for isolated populations of lesser prairie-chicken in the Permian Basin/western panhandle of Texas, populations residing on Forest Service lands in southeastern Colorado, and areas south of highway 380 in southeastern New Mexico. While the impending loss of these populations represents a significant step toward federal listing of the species, we believe that given all currently available information, the net benefits of ongoing conservation activities by the states, federal agencies and private groups, combined with the recent increase in both range and population size in Kansas, exceed the latest negative trends of local populations in the southern periphery of the occupied range. However, we will continue to monitor the effectiveness of the current conservation efforts to stabilize and increase existing populations throughout significant portions of the remaining range.

__X__ Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed? Yes.

Is Emergency Listing Warranted? No. Emergency listing of the lesser prairie-chicken is not warranted at the time of this review since the species is not in immediate danger of range wide extinction.

DESCRIPTION OF MONITORING: The Service continues to maintain frequent communication with state wildlife agencies, the NRCS, Forest Service, private conservation groups, and private landowners to obtain all relevant information pertaining to the lesser prairie-chicken. In addition to attending annual Lesser Prairie-chicken Interstate Working Group meetings, Service biologists also attend related meetings such as the Prairie Grouse Technical Council conference, and other grouse and grassland focused conferences. With few exceptions, most restoration projects for the species conducted by Service personnel are completed in cooperation with other conservation groups in each state. As a result, the information flow to and from the Service regarding the species is very active and of a positive nature. The Service solicits and reviews annual lesser prairie-chicken status reports completed by the state agencies and public lands agencies, and also records all pertinent information provided by private individuals within the species file for each state. New research and management publications for the lesser prairie-chicken and similar species are continually obtained, carefully evaluated and added to the Service's literature database.

COORDINATION WITH STATES

Indicate which State(s) (within the range of the species) provided information or comments on the species or latest species assessment: Colorado, Kansas, New Mexico, Oklahoma, and Texas.

Indicate which State(s) did not provide any information or comments: NA

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APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve: /s/ Rich McDonald 11/17/2005
Acting Regional Director U.S. Fish and Wildlife Service Date

Concur: _____ August 23, 2006
Director, Fish and Wildlife Service Date

Do not concur: _____
Director, Fish and Wildlife Service Date

Date of annual review: 10/21/05
Conducted by: Stephanie A. Harmon